

REMARKS

Claims 1-11 and 13-21 are all the claims presently pending in the application. Claim 12 has been canceled. Claim 19 has been withdrawn from prosecution. Claims 1, 2, 11 and 19 have been amended to more particularly define the claimed invention. Claims 20 and 21 have been added.

It is noted that the claim amendments are made only for more particularly pointing out the invention, and not for distinguishing the invention over the prior art, narrowing the claims or for any statutory requirements of patentability. Further, Applicant specifically states that no amendment to any claim herein should be construed as a disclaimer of any interest in or right to an equivalent of any element or feature of the amended claim.

Claim 11 stands rejected under 35 U.S.C. § 112, second paragraph as allegedly being indefinite. Applicant notes that claim 11 has been amended to address the Examiner's concerns. Therefore, claim 11 is clear and not indefinite, and the Examiner is respectfully requested to withdraw this rejection.

Claims 1-18 stand rejected under 35 U.S.C. § 103(a) as allegedly unpatentable over Shiozaki et al. (JP 2003-007298) in view of Yamaguchi et al. (U. S. Pat. Pub. 2002/0037458). Claims 1-15 and 17 stand rejected under 35 U.S.C. § 103(a) as allegedly unpatentable over Iwakoshi et al. (JP 08-213015) in view of Yamaguchi et al. (U. S. Pat. Pub. 2002/0037458).

These rejections are respectfully traversed in view of the following discussion.

I. THE CLAIMED INVENTION

An exemplary aspect of the claimed invention (e.g., as defined by claim 1) is directed to a nonaqueous electrolyte battery including a positive electrode, a negative electrode, and a nonaqueous electrolyte. The nonaqueous electrolyte includes a cyclic carbonate having a carbon-carbon π bond in an amount which is not greater than 20% by weight of the nonaqueous electrolyte.

Importantly, the positive electrode includes a positive active material including a composite oxide represented by a composite formula: $\text{Li}_x\text{Mn}_a\text{Ni}_b\text{Co}_c\text{O}_2$ (wherein $0 \leq x \leq 1.1$, $a+b+c=1$, $|a-b| < 0.05$, $0.67 \leq c \leq 0.84$) and having an $\alpha\text{-NaFeO}_2$ -type crystal structure (Application at page 48, lines 9-22).

In another exemplary aspect of the claimed invention (e.g., as defined by claim 2) a nonaqueous electrolyte battery includes a positive electrode having a positive active material including a composite oxide represented by a composite formula: $\text{Li}_x\text{Mn}_a\text{Ni}_b\text{Co}_c\text{M}_d\text{O}_2$ (wherein $0 \leq x \leq 1.1$, $a+b+c+d=1$, $|a-b| < 0.05$, $0.33 \leq c \leq 0.84$, $0 < d \leq 0.1$) and having an α - NaFeO_2 -type crystal structure (Application at page 16, line 3; page 48, lines 2-22).

In conventional batteries, a nonaqueous solvent may decompose at the negative electrode, causing gas to be generated which causes the battery to swell (Application at page 4, lines 5-10).

In an exemplary aspect of the claimed invention (e.g., claim 1), on the other hand, the positive electrode includes a positive active material including a composite oxide represented by a composite formula: $\text{Li}_x\text{Mn}_a\text{Ni}_b\text{Co}_c\text{O}_2$ (wherein $0 \leq x \leq 1.1$, $a+b+c=1$, $|a-b| < 0.05$, $0.67 \leq c \leq 0.84$) and having an α - NaFeO_2 -type crystal structure, and in another exemplary aspect of the claimed invention (e.g., claim 2), the positive electrode includes a positive active material including a composite oxide represented by a composite formula: $\text{Li}_x\text{Mn}_a\text{Ni}_b\text{Co}_c\text{M}_d\text{O}_2$ (wherein $0 \leq x \leq 1.1$, $a+b+c+d=1$, $|a-b| < 0.05$, $0.33 \leq c \leq 0.84$, $0 < d \leq 0.1$) and having an α - NaFeO_2 -type crystal structure. These features may help to restrain swelling and improve battery performance.

III. THE ALLEGED PRIOR ART REFERENCES

A. Shiozaki and Yamaguchi

The Examiner alleges that Shiozaki would have been combined with Yamaguchi to form the invention of claims 1-18. Applicant would submit, however, that these alleged references would not have been combined and even if combined, the alleged combination would not teach or suggest each and every element of the claimed invention.

In particular, Applicant respectfully submits that these alleged references are unrelated. Indeed, no person of ordinary skill in the art would have considered combining these disparate references, absent impermissible hindsight.

In fact, Applicant submits that the references provide no motivation or suggestion to urge the combination as alleged by the Examiner. Indeed, these references clearly do not teach or suggest their combination. Therefore, Applicant respectfully submits that one of ordinary skill in the art would not have been so motivated to combine the references as

alleged by the Examiner. Therefore, the Examiner has failed to make a prima facie case of obviousness.

Moreover, neither Shiozaki, nor Yamaguchi, nor any alleged combination thereof teaches or suggests "*wherein the positive electrode comprises a positive active material comprising a composite oxide represented by a composite formula: $Li_xMn_aNi_bCo_cO_2$ (wherein $0 \leq x \leq 1.1$, $a+b+c=1$, $|a-b| < 0.05$, $0.67 \leq c \leq 0.84$) and having an α - $NaFeO_2$ -type crystal structure*", as recited, for example, in **claim 1**, or "*wherein the positive electrode comprises a positive active material comprising a composite oxide represented by a composite formula: $Li_xMn_aNi_bCo_cM_dO_2$ (wherein $0 \leq x \leq 1.1$, $a+b+c+d=1$, $|a-b| < 0.05$, $0.33 \leq c \leq 0.84$, $0 < d \leq 0.1$) and having an α - $NaFeO_2$ -type crystal structure*", as recited, for example, in **claim 2**. As noted above, these features may help to restrain swelling and improve battery performance.

Clearly these features are not taught or suggested by Shiozaki.

Indeed, with respect to claim 1, Applicant submits that Shiozaki clearly does not teach or suggest the features of claim 1. In fact, Shiozaki teaches simply that $0 \leq c \leq 0.34$ (Shiozaki at Abstract). Further, Applicant notes that the range of c, " $0.67 \leq c \leq 0.84$ ", in claim 1 of the present application is not suggested from Example 1 ($LiMn_{0.33}Ni_{0.33}Co_{0.33}O_2$) in Shiozaki.

Further, Yamaguchi clearly does not make up for the deficiencies of Shiozaki with respect to claim 1. Indeed, Yamaguchi simply teaches a cathode active material including a lithium-manganese composite oxide expressed by the general formula $Li_xMn_{2-y}M'_yO_4$, wherein M' indicates at least one element selected from Fe, Co, Ni, Cu, Zn, Al, Sn, Cr, V, Ti, Mg, Ca and Sr, and $0.5 \geq y \geq 0.01$ (Yamaguchi at [0017]).

Thus, even assuming (arguendo) that it is described in Yamaguchi that an aqueous electrolyte containing vinylene carbonate is used in a battery having $LiCoO_2$ as a positive active material, it is not obvious from Shiozaki and Yamaguchi that the nonaqueous electrolyte battery excellent in high-temperature storage-resistant performance can be obtained by using, as a positive active material, $Li_xMn_aNi_bCo_cO_2$ wherein $|a-b| < 0.05$ and $0.67 \leq c \leq 0.84$, as recited in claim 1 of the present application.

Further, with respect to claim 2, nowhere does Shiozaki teach or suggest $Li_xMn_aNi_bCo_cM_dO_2$ (wherein $0 \leq x \leq 1.1$, $a+b+c+d=1$, $|a-b| < 0.05$, $0.33 \leq c \leq 0.84$, $0 < d \leq 0.1$)

where M includes a member selected from the group consisting of V, Al, Mg, Cr, Ti, Cu and Zn.

Likewise, Yamaguchi does not teach or suggest this feature. Indeed, as noted above, Yamaguchi simply discloses $\text{Li}_x\text{Mn}_{2-y}\text{M}'_y\text{O}_4$, wherein M' indicates at least one element selected from Fe, Co, Ni, Cu, Zn, Al, Sn, Cr, V, Ti, Mg, Ca and Sr, and $0.5 \geq y \geq 0.01$ (Yamaguchi at [0017]). Therefore, Yamaguchi does not make up for the deficiencies of Shiozaki with respect to claim 2.

Thus, because it is not suggested from the cited references that the effect of the present invention can be taken within the range of d of $0 < d \leq 0.1$ in claim 2, the present invention is not obvious over the cited references.

Therefore, Applicant would submit that these alleged references would not have been combined and even if combined, the alleged combination would not teach or suggest each and every element of the claimed invention. Therefore, the Examiner is respectfully requested to withdraw this rejection.

B. Iwakoshi

The Examiner alleges that Iwakoshi would have been combined with Yamaguchi to form the invention of claims 1-15 and 17. Applicant would submit, however, that these alleged references would not have been combined and even if combined, the alleged combination would not teach or suggest each and every element of the claimed invention.

In particular, Applicant respectfully submits that these alleged references are unrelated. Indeed, no person of ordinary skill in the art would have considered combining these disparate references, absent impermissible hindsight.

In fact, Applicant submits that the references provide no motivation or suggestion to urge the combination as alleged by the Examiner. Indeed, these references clearly do not teach or suggest their combination. Therefore, Applicant respectfully submits that one of ordinary skill in the art would not have been so motivated to combine the references as alleged by the Examiner. Therefore, the Examiner has failed to make a prima facie case of obviousness.

Moreover, neither Iwakoshi, nor Yamaguchi, nor any alleged combination thereof teaches or suggests "*wherein the positive electrode comprises a positive active material*

*comprising a composite oxide represented by a composite formula: $Li_xMn_aNi_bCo_cO_2$ (wherein $0 \leq x \leq 1.1$, $a+b+c=1$, $|a-b| < 0.05$, $0.67 \leq c \leq 0.84$) and having an α - $NaFeO_2$ -type crystal structure", as recited, for example, in **claim 1**, or "wherein the positive electrode comprises a positive active material comprising a composite oxide represented by a composite formula: $Li_xMn_aNi_bCo_cM_dO_2$ (wherein $0 \leq x \leq 1.1$, $a+b+c+d=1$, $|a-b| < 0.05$, $0.33 \leq c \leq 0.84$, $0 < d \leq 0.1$) and having an α - $NaFeO_2$ -type crystal structure", as recited, for example, in **claim 2**. As noted above, these features may help to restrain swelling and improve battery performance.*

Clearly this feature is not taught or suggested by Iwakoshi.

Indeed, with respect to claim 1, the Examiner alleges in paragraph 11 of the Office Action that Iwakoshi describes 0.01 as an endpoint of c and b (allegedly corresponding to a and b in the claimed invention). Because the amended claim 1 recites $0.67 \leq c \leq 0.84$ and $a+b+c=1$, a+b can be calculated into $0.16 \leq a+b \leq 0.33$. However, under the condition of $|a-b| < 0.05$, numerical numbers of a and b in the claimed invention (allegedly corresponding to c and b in Iwakoshi) each should have numerical numbers exceeding 0.055.

Accordingly, Iwakoshi does not teach or suggest a positive electrode including a positive active material comprising a composite oxide represented by a composite formula: $Li_xMn_aNi_bCo_cO_2$ (wherein $0 \leq x \leq 1.1$, $a+b+c=1$, $|a-b| < 0.05$, $0.67 \leq c \leq 0.84$) and having an α - $NaFeO_2$ -type crystal structure, as in the invention of claim 1.

With respect to claim 2, Applicant again notes that the Examiner states in paragraph 11 of the Office Action that Iwakoshi describes 0.01 as an endpoint of c and b (allegedly corresponding to a and b in the claimed invention). Because c in Iwakoshi corresponds to a+d of the claimed invention, the case where c and b (allegedly corresponding to a and b in the claimed invention) represent 0.01, simultaneously is limited to the case of d=0 in the claimed invention.

However, because the amended claim 2 recites $0 < d \leq 0.1$, in such a case, c and b in Iwakoshi (allegedly corresponding to a and b in the claimed invention) do not have 0.01, simultaneously.

Therefore, Iwakoshi clearly does not teach or suggest a positive electrode including a positive active material which includes a composite oxide represented by a

composite formula: $\text{Li}_x\text{Mn}_a\text{Ni}_b\text{Co}_c\text{M}_d\text{O}_2$ (wherein $0 \leq x \leq 1.1$, $a+b+c+d=1$, $|a-b| < 0.05$, $0.33 \leq c \leq 0.84$, $0 < d \leq 0.1$) and having an $\alpha\text{-NaFeO}_2$ -type crystal structure, as in the invention of claim 2.

Further, as noted above, Yamaguchi does not teach or suggest the features of claim 1 and claim 2. Therefore, Yamaguchi does not make up for the deficiencies of Iwakoshi.

Therefore, Applicant would submit that these alleged references would not have been combined and even if combined, the alleged combination would not teach or suggest each and every element of the claimed invention. Therefore, the Examiner is respectfully requested to withdraw this rejection.

III. FORMAL MATTERS AND CONCLUSION

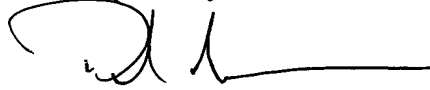
In view of the foregoing, Applicant submits that claims 1-11 and 13-21, all the claims presently pending in the application, are patentably distinct over the prior art of record and are in condition for allowance. The Examiner is respectfully requested to pass the above application to issue at the earliest possible time.

Should the Examiner find the application to be other than in condition for allowance, the Examiner is requested to contact the undersigned at the local telephone number listed below to discuss any other changes deemed necessary in a telephonic or personal interview.

The Commissioner is hereby authorized to charge any deficiency in fees or to credit any overpayment in fees to Attorney's Deposit Account No. 50-0481.

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Respectfully Submitted,



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